

9.3 Notes: Solving Multistep Inequalities

★ Remember to reverse the inequality symbol when multiplying or dividing by a negative number


Examples

Single step:

a) $\frac{3x}{3} \geq \frac{15}{3}$
 $x \geq 5$

verify

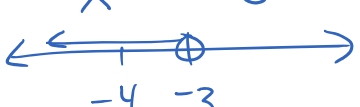
- $3x = 15$
- $3(5) = 15 \checkmark$ ← verifies that boundary point is correct
- $3(6) \stackrel{?}{\geq} 15$
 $18 \geq 15 \checkmark$ ← verifies that solution is correct



b) $\frac{5+x}{-5} < \frac{2}{-5}$
 $x < -3$

verify

- $5+x = 2$ (boundary pt) \checkmark
 $5+(-3) \stackrel{?}{=} 2 \checkmark$
- $5+x < 2$ (solution) \checkmark
 $5+(-4) \stackrel{?}{<} 2$
 $1 < 2 \checkmark$




Two step:

c) $\frac{4x+11}{-11} > \frac{35}{-11}$
 $\frac{4x}{4} > \frac{24}{4}$
 $x > 6$

verify (plug into original equation)

boundary pt: $4(6) + 11 \stackrel{?}{=} 35$
 $24 + 11 \stackrel{?}{=} 35$
 $35 = 35 \checkmark$

solution: $4(7) + 11 \stackrel{?}{>} 35$
 $28 + 11 \stackrel{?}{>} 35$
 $39 > 35 \checkmark$



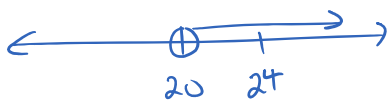
o open circle > or <

○ open circle $>$ or $<$
 ● closed circle \geq or \leq or $=$

d) $\frac{x}{4} + 3 > 8$
 $\quad \quad \quad -3 \quad \quad -3$

~~4~~ $\cdot \frac{x}{4} > 5 \cdot 4$

$x > 20$



verify
 boundary pt: $\frac{(20)}{4} + 3 \stackrel{?}{=} 8$
 $5 + 3 = 8 \checkmark$

solution: $\frac{(24)}{4} + 3 \stackrel{?}{>} 8$
 $6 + 3 > 8$
 $9 > 8 \checkmark$

e) $-2(x+3) \leq 10x+18$

$-2x - 6 \leq 10x + 18$
 $\quad \quad \quad +6 \quad \quad +6$

$-2x \leq 10x + 24$
 $\quad \quad \quad -10x \quad \quad -10x$

$-12x \leq 24$

$\frac{-12x}{-12} \geq \frac{24}{-12}$

$x \geq -2$



$\frac{-24}{12} \leq \frac{12x}{12}$

verify
 $-2 \leq x$

boundary pt: $-2((-2)+3) \stackrel{?}{=} 10(-2)+18$
 $-2 \stackrel{?}{=} -2 \checkmark$

solution: $-2(0+3) \leq 10(0)+18$
 $-6 \leq 18 \checkmark$

Practice

pg 365

4-7, 11-18

Word problems

See pg 363 Ex 2